Russell R. McMurry, P.E., Commissioner
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May 24, 2022

Tracy Simmons
Branch Chief, Policy and Licensing Division
Public Safety and Homeland Security Bureau
Federal Communications Commission

RE: Meeting to discuss C-V2X waiver with State of Georgia

Dear Mr. Simmons:

In response to your questions from April 15, 2022, the Georgia Department of Transportation offers the following responses. We are available to discuss these responses, or other issues, as needed and at your convenience. We appreciate your cooperation with us as we attempt to operate LTE C-V2X roadside units in accordance with DA 21-962.

Please review DA 21-962 footnote 10 and provide answers if C-V2X RSU or OBUs are unable to comply with existing ITS rules.

PN certifications and questions that need clarification:

(1) a certification that there are no existing ITS licensees authorized to operate within the same geographic area in which the waiver applicant seeks to operate, OR certification that the waiver applicant has coordinated with every existing ITS licensee licensed (in whole or part) within that same geographic area to ensure that the waiver applicant's C-V2X-based roadside unit operations will not interfere with any DSRC-based roadside units operating in the 5.895-5.925 GHz band;

1. **How will C-V2X deployment co-exist with DSRC licensed in the state and in adjacent areas?**
    a. GDOT is deploying LTE C-V2X radios adjacent to DSRC radios at signalized intersections in the state. The radios are attached to an existing pole at the intersections with a manufacturer recommended distance between the two radios. DSRC radios will be operating on a 10 MHz channel (ch.180), and the LTE C-V2X radios will be operating on a 20 MHz channel (ch.183). All locations in which these radios are deployed are within public ROW and GDOT or another local municipal government will be the only deployers of these radios.
2. **Has there been any testing?**

   a. GDOT testing has been limited to the operation and testing of devices we are deploying and successful packet reception in a laboratory setting with both DSRC and LTE C-V2X transmitting simultaneously. We have research underway that is exploring the impacts of unlicensed Wi-Fi in adjacent bands and its effect on ITS applications in the 30 MHz band.

3. **If there is a report of interference, how would it be addressed?**
   a. GDOT would terminate operations of any device causing interference. We would investigate any issues or mitigation strategies prior to recommencing operations.
4. **What is the schedule for RSU deployment with C-V2X technology?**
   a. GDOT has over 750 locations scheduled for deployment. We have close to 200 of these devices already delivered and will continue to install as deliveries arrive, which should be complete by December 2022. GDOT already has over 900 DSRC locations installed. No radios will be powered on until they receive licensure from the FCC.

(2) a certification that the waiver applicant's C-V2X operations will comply with the existing technical rules (e.g., including, but not limited to, power and out-of-band emission limits) for DSRC-based technologies8 other than the portion of the current rules requiring use of DSRC-based technologies;

1. **Clarify what technology is being deployed "C-V2X" — do you mean 4G-LTE C-V2X, or 5G-NR C-V2X**
   a. GDOT is only deploying LTE C-V2X (3GPP Rel. 14). To our knowledge, 5G-NR C-V2X standards (3GPP Rel. 16) have not yet been or have just been finalized, and there is no commercially available 5G-NR C-V2X roadside units commercially available for use.
2. **Waiver does not list specific technical specs for the C-V2X technology so does not comply with the current DSRC rules. What is the technical bandwidth and emissions for this C-V2X equipment?**
   a. The LTE C-V2X RSUs which we are requesting licensing for are manufactured by Danlaw, Inc. Output power level from modem is 23dbm (Modem Max power level is 23dbm). It can be lower than this but never be higher, with antenna power gains to be added (~2dbm). The manufacturer currently configures the device for Ch. 183, 23dbm, 20MHz bandwidth. It can also be configured to Ch. 184, to operate at 10Mhz bandwidth and 23 dbm. These are software configurable changes.
3. **Does this C-V2X equipment met the DSRC rules and who is making the certification the equipment complies with existing technical rules.**
   a. Compliance with existing DSRC rules and regulations is provided by the manufacturer of the devices we procure. For the waivers we have submitted, they are all devices manufactured by Danlaw, Inc.

(3) a certification that the applicant's operations will be revised to the extent necessary to comply with any final rules that the Commission adopts for C-V2X operations; and

1. **How is the equipment updated to comply with the final C-V2X rules?**
    a. Power level emissions and bandwidth for these specific LTE C-V2X devices are all configurable through software modifications.

(4) a certification that the applicant's C-V2X operations will be limited to transportation and vehicle safety-related communications.

1. **What transportation and vehicles will get the updated OBUs?**
    a. Our waiver request does not include any OBU deployments. Our RSU deployments are intended to be able to interact with any vehicle – public sector fleet (buses, emergency vehicles, etc) or private vehicles – that are equipped with on-board units (OBUs) capable of receiving messages over LTE C-V2X and have appropriate security and trust certificates and considerations.
2. **Is the state testing with any other government agency or company granted under an experimental license?**
    a. Yes. We have a partnership with Panasonic for 13 sites near Lagrange, GA. These devices are dual-mode DSRC/LTE C-V2X RSUs. The LTE C-V2X radios are operating under an experimental license held by Panasonic. The DSRC radios are operating under the State of Georgia call-sign.
3. **How do you limit the C-V2X technology from going outside your state?**
    a. We are only requesting licenses for roadside unit radios at fixed locations. They will not be moved from the locations in which they are licensed to operate. If we have a need to ever move them, we would modify their license to be relocated. Since these RSUs are being procured by the State of Georgia, we do not see any scenario in which they would ever be operating beyond the borders of the state of Georgia.

Thank you for your consideration. If you have any questions, please do not hesitate to contact me at 404-635-2828.

Sincerely,

Alan Davis, PE, PTOE
State Traffic Engineer
Georgia Department of Transportation